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RANGE CATTLE IN EASTERN MONTANA CONSUMED
ABNORMAL AMOUNTS OF SALT DURING
THE 1934 DROUGHT

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Salt consumption by range cattle in Southeastern Montana was considerably above normal during the summer grazing season of 1934. This was very noticeable for the main herd of more than 400 breeding cows at the United States Range Livestock Experiment Station near Miles City, and was especially marked for 60 young cows and their calves for which detailed records are available. These cows were grazed on typical shortgrass range pastures that are being subjected to three intensities of grazing in a range management experiment begun in 1932.*

Crystal sack salt was supplied to these cattle in boxes about one-fourth mile from the one permanent watering place. These boxes were replenished with fresh supplies of salt whenever they became empty or nearly so. The contrast between the salt consumption for the 1934 season and that for the 1933 season is very evident in the accompanying table.

In addition to the quantities of salt shown in the table, bone meal was fed

salt boxes was caused by weather conditions during both years. This waste was probably greater in 1933 than in 1934, since there was considerably more rain during 1933 and the wind was about equally severe during each of the two years.

During the severe drouth in the summer of 1934 it was discovered that these cattle were using ~~three~~ to four times as much mixed salt and bone meal as they had used the preceding summer. For the remainder of the season, salt and bone meal were fed separately. The high rate of consumption continued for both. There was no apparent correlation between grazing intensity and abnormal consumption of salt and bone meal. However, the rate of consumption declined sharply after supplemental hay feeding began. The supplemental feed supplied was baled alfalfa hay.

The question naturally arises why these cattle used abnormal quantities of salt and bone meal during the 1934 summer grazing period.

The same cows grazed these pastures

COMPARATIVE RECORD OF SALT CONSUMED BY RANGE COWS ON SHORTGRASS PASTURES
NEAR MILES CITY, MONT., DURING THE "NORMAL" SEASON OF 1933 AND
THE DROUTH SEASON OF 1934.

Year	Rainfall	Average Salt Consumption Per Cow-Month Under Various Range Forage Conditions.			Total salt consumed per cow during approximately 6 months.			
		Forage mostly green and abundant.	Forage mostly dry, supply light to scanty.	So dry and scanty that supplemental hay feeding necessary.				
		Period	Salt Pounds	Period	Salt Pounds	Period	Salt Pounds	Salt Pounds
1933	Nearly normal	May 12 to mid-July	0.7	Mid-July to Nov. 13	0.8			4.6
1934	Severe drouth	May 15 to mid-June	1.5	Mid-June to July 31	3.5	Aug. 1 to Oct. 18	1.7	xx 11

in the quantities of 0.03 pound per cow-month in 1933 and 0.39 pound per cow-month in 1934. During the 1933 season and most of the 1934 season the bone meal was mixed with the salt. Some waste of both salt and bone meal put in

*This project is conducted by the Northern Rocky Mountain Forest and Range Experiment Station of the U. S. Forest Service, at the U. S. Range Livestock Experiment Station in cooperation with the U. S. Bureau of Animal Industry.

in both 1933 and 1934. Permanent water that contains considerable sodium and other mineral salts was supplied to all cows during both seasons from one centrally located well. Following two or three summer rains in 1933, surface water was available for a few days at a time in small water holes in the draws; but it is very doubtful that use of this temporary supply of surface water materially influenced the season's

°Because of drought conditions the stock were removed from pastures at end of approximately five months.

total salt consumption. The chief difference observable between 1934 and 1933 conditions was that severe drouth occurred in 1934 and not in 1933.

Precipitation at Miles City in the entire year of 1934 totaled only 5.51 inches. This was 8.28 inches below normal, making 1934 the most severe drouth year on record. During April, May, and June, the three months of greatest plant growth, precipitation totaled only 1.40 inches as compared with a normal of 6.02 inches for these months.

A deficiency of 1.05 inches had accumulated during the previous six months. Thus, soil-moisture conditions in the spring of 1934 were extremely unfavorable for growth. In 1933 the precipitation deficiency was only 3.55 inches for the whole year. April, May and June, accounted for 2.33 inches of this deficiency so that spring moisture conditions were much more favorable for forage growth than in 1934.

In 1933, forage in the experimental pastures continued to grow until the latter part of June, remained at least partially green until the middle of July, and sufficient forage was produced in all the pastures to maintain the cattle through the six-month summer season without supplemental feed. In 1934 most of the forage plants ceased growth in early May, and became dry and brittle by the middle of June.

On the basis of various indices it is estimated that the volume of forage produced in the pastures in 1934 was not more than 25 percent of that produced in 1933. Supplemental feeding was required by cows on the overgrazed pastures in September. Beginning in June of 1934, sagebrush and old ungrazed forage produced the previous year were practically the only feeds available for the cattle until supplemental hay feeding began. Whereas cows consistently gained in weight until August in 1933, they began to lose weight in May and June of 1934.

It will be noted from the table that in 1933 salt consumption was slightly higher during the summer-fall period than during the spring, and that in 1934 it was more than twice as high during midsummer as during the spring. Jardine and Anderson, (1) in discussing range cattle management on the national forests, state that cattle should ordinarily have two pounds of salt per cow-month while the vegetation is succulent and one pound per cow-month during the remainder of the season.

Summer salt consumption on these shortgrass ranges, therefore, appears to differ from that on most national-forest bunchgrass ranges, where forage is

more succulent, in two respects: First, in a normal season the total requirement is much smaller; and second, the requirement is greater in midsummer than in the spring.

There are conflicting data as to the comparative total mineral constituents of immature and mature range grasses. It seems well established, however, that the percentage of certain minerals in the grasses steadily decreases from mid-spring until about October and that on semi-arid range areas leaching proceeds rather slowly during the winter.

Daniel and Harper (2) found that soil moisture during the growing period is a very important factor in increasing or retarding forage plants' intake of calcium and phosphorus from the soil. Archibald (4) concludes that of all factors influencing the chemical composition of grasses, the most important is quantity of rainfall. McCall (3) found little change in the chemical composition of bunchgrass in Eastern Washington from October on through the winter.

These findings seem to explain the abnormal consumption of salt and bone meal on the Miles City pastures during the severe drouth of 1934. It appears that, because of the severe drouth, range forage produced on the shortgrass plains in 1934 failed to supply normal quantities of minerals, and that old growth left from 1933 and used in 1934 was inadequate to supply this deficiency.

Good range and cattle management during drouth thus seems to call not only for supplemental feeding but for extraordinary supplies of salt and of some phosphorus-rich material such as bone meal.

(1) Jardine, J. T., and Anderson, M. Range Management on the National Forests. U. S. Department of Agriculture Bulletin 790, 96 pages, illustrated, 1919. Sampson, writing of pasture husbandry of beef cattle, makes the similar statement that "during the spring and summer when the forage is succulent—a period of about five months—ten pounds of salt, or two pounds a month to the head, is not excessive. During the cooler, non-succulent forage period, less salt is required and ordinarily cattle will not devour more than about one and one-half pounds a month, or a total of about 20 pounds a year." (Sampson, A. W. Livestock Husbandry on Range and Pasture, 404 pages, illustrated. New York, 1928.)

(2) Daniel, H. A., and Harper, H. J. The Relation Between Total Calcium and Phosphorus in Mature Prairie Grass and Available Plant Food in the Soil. Jour. Am. Soc. Agron. 26:986-992. 1934.

(3) McCall, E. R. Seasonal Variation in the Composition and Digestibility of Certain Species of Range Grasses. (Unpublished thesis. Copy on file Washington State College, Pullman.) 1932.

(4) Archibald, J. C. The Chemical Composition of Grass from Plots Fertilized and Grazed Intensively in 1929. Jour. Agr. Research 41:491-501, illustrated. 1930